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OPERATIONAL DESIGN: THE IMPORTANCE OF
GETTING THE FUNDAMENTALS RIGHT

by

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PURPOSE

The purpose of this paper is to examine the fundamental importance of operational design and recommend how it should contribute to campaign planning and execution.

PART 1 – THE CHALLENGE

Introduction

There is a distinct nostalgia among military professionals of a certain age for the comfortable and familiar challenge posed by our Cold War adversaries. Some of that nostalgia still lingers in our institutional DNA. It is clear, however, that we need to adapt and learn quickly in the contemporary operating environment. There is a dilemma. We must discard that which hinders agility and adaptation, whilst retaining our foundational knowledge. The dynamic tension between these competing imperatives and the debate it fosters is healthy and productive. One of the most keenly contested and important of those debates (at least within planning circles) centers on the growing contribution of operational design. Design will play an increasingly important role in campaign planning and execution at the operational level of war. In order to realize its potential, it must escape the doctrinal cloister and become intrinsic to the practice of military command. The fundamentals of operational design and how they relate to each other must be clearly understood by commanders, staff and the components. This paper will argue that the development of operational design should stress getting its fundamentals right. It will stress the design debate should focus less on refining framing methodologies and more on decision support to the commander.

The fundamentals of operational design are not well served by current doctrine. This paper will argue that design's doctrinal foundation is flawed and that some of the core concepts

are unclear. Competing and emerging design frameworks tend to concentrate on mission analysis and framing methodologies. Those that are more responsive to the operational environment stress the importance of learning during execution in order to reframe the problem. Framing and reframing play important and necessary roles. However, the emphasis on problem framing reflects unhappiness with current planning concepts and our collective failure to recognize and adapt to the insurgency in Operation Iraqi Freedom (OIF). This paper will stress that we have neglected to develop operational design's potential unifying and analytical contribution to commanders' decision support. The identification of major 'preplanned' decisions points and their integration into the campaign design are crucially important. They are decisions the commander is *going* to make, ranging from phase transition to the commitment of major force elements. If the design development centers on the major decision points, the commander should be able to articulate major decisions and risk to his leadership, interagency peers and subordinate components. Operational design should support emergent and 'imposed' decision points in the same manner.

Complexity

The end of the Cold War and, even more significantly, the initiation of the Global War on Terror have clearly heralded deep changes in the dynamics of US foreign and security policy. Whether these seismic events changed the very nature of war is however, debatable. Most observers agree the near future will comprise "uncertainty, complexity, rapid change, and persistent conflict."¹ Furthermore, these threats will be globalized, widely distributed and increasingly lethal. Conflict is 'likely to involve a range of transnational, state, group and individual participants ... at global and local levels'² and 'concurrent inter-communal violence,

terrorism, insurgency, pervasive criminality and widespread disorder.’³ Increasing competition for resources and the pressures induced by demographic growth, wealth inequality and climate change are likely to cause conflict in hitherto relatively stable regions. Many of the types of security challenges envisaged will not be readily suited to the structured application of military force we grew accustomed to in the twentieth century.

Complexity is already present in the globalized, distributed and increasingly lethal contemporary operating environment (COE). Complexity in itself is not new as ‘conflict is inherently complex and unpredictable.’⁴ However, some observers have suggested that current trends observed in the COE will tend to magnify structurally and interactively in complex scenarios.⁵ Furthermore, a ‘temporal dimension’⁶ will multiply that complexity as regular and irregular adversaries rapidly learn and adapt. This ‘complex adaptive’ enemy will learn to exploit asymmetries⁷ and will not be dependent upon centralized command and control relationships.

The challenges of the current and future operational environment are not limited to our adversaries’ unpredictability. The types of struggles envisaged by the Capstone Concept for Joint Operations (CCJO) will be protracted and ‘will not lend themselves to decisive military victory, but often at best will be amenable to being managed continuously over time.’⁸ The problem set is likely to be characterized by what Rittel and Webber described as ‘wicked’ problems.⁹ Wicked or complex problems are effectively unsolvable in that there are ‘no “solutions” in the sense of definitive and objective answers.’¹⁰ These types of problems possess two central and intractable challenges: what to do, and how to do it.

“....we are all beginning to realize that one of the most intractable problems is that of defining problems (of knowing what distinguishes an observed condition from a desired condition) and of locating problems (finding where in the complex causal networks the trouble really lies). In turn, and equally intractable, is the problem of identifying the actions that might effectively narrow the gap between what-is and what-ought-to-be.”¹¹

Wicked or ill-structured problems present serious challenges to political and military leaderships. Not only is there no definitive way to formulate ill-structured problems, but they cannot be understood without proposing a solution.¹² This dilemma is most acute at the operational level of war, where strategic objectives are articulated and linked to tactical action.¹³ The combination of adaptive enemies, the complexity of the COE and the expansion of ill-structured problem sets have created significant developments in the application of operational art and its expression through design.¹⁴ At the core of the surge in design development is the idea that a different mindset is essential to grapple with these problems. That mindset is described in TRADOC Pamphlet 525-3-0: Operational Adaptability. The publication calls for Army leaders to ‘exhibit based on critical thinking, comfort with ambiguity and decentralization, a willingness to accept prudent risk, and an ability to make rapid adjustments based on a continuous assessment of the situation.’¹⁵

“To him who looks upon the world rationally, the world in its turn presents a rational aspect. The relation is mutual.”

Georg Wilhelm Friedrich Hegel¹⁶

Our experience in the post-911 security environment has taught us to look upon the world with a less than rational aspect. The ability ‘to adapt in stride when surprise strikes’¹⁷ will require imagination, an understanding of the operational environment, skill and experience - in other words, the commander’s insight or operational art.¹⁸ The operational design that underpins operations will need to be similarly flexible and adaptive.

The COE and the ill structured problems it will pose have generated significant debate within military establishments. There is increasing concern that our doctrinal approach to campaign design, mission analysis and our ability to learn and adapt during execution need to change to meet the challenge. Some of those concerns stem from the perception that problem framing and planning failures were responsible for many of the destructive consequences of operations in Iraq and Afghanistan.

Perception of Failure – Operation Iraqi Freedom

Doctrine is not written in a vacuum. Much of the dissatisfaction with the doctrinal approach to design is colored by our recent operational experience. Indeed, some observers have identified the perception that inadequate design contributed to many of the destructive consequences of early operations in Iraq. The specter of failure to properly frame the problem in the sixteen months leading up to the March 2003 haunts the debate. However, the failures in the design and planning of OIF are more fundamental. Distinct departures from existing planning processes contributed significantly. Failure in OIF Phase IV was directly related to the political and military leaderships’ *predisposition towards a specific course of action* (COA) and its inability to identify and adapt at critical decision points. Predisposition to a specific COA and flawed decision analysis contributed to weakness in the operational design of OIF.

There has been much debate over the size of the US force employed in OIF. In testimony before the Senate Armed Services Committee in February 2003, General Eric J Shinseki opined that a force of ‘something on the order of several hundred thousand soldiers’¹⁹ would be required for Phase IV operations across Iraq. Former CENTCOM CINC General Tony Zinni also expressed his misgivings to the Senate Foreign Relations Committee about ‘interpretations of intelligence that many of us with deep experience in the region felt were far off the mark from the true threat.’²⁰ The testimony of these senior officers drew ‘strong, critical responses’²¹ from Secretary Rumsfeld and Deputy Secretary Wolfowitz. The latter described Shinseki’s estimate as ‘wildly off the mark.’ The congressional testimony of Deputy Secretary Wolfowitz revealed three primary reasons²² for the administration’s desire for lower troop numbers: optimism over Iraqi society’s ethnic cleavages; fear of the impression that a large US force would be seen as an occupier rather than a liberator, and the desire to inspire Iraqis to rebuild their country. A further motivation for a smaller force was the ongoing Defense Transformation program and experience in OEF. Both of these factors encouraged the employment of smaller, more agile forces.

The political context surrounding OIF ‘undermined and outright discouraged military adjustment to the new challenges faced in Iraq.’²³ Furthermore, the political imperative to launch decisive military operations with a small force had the effect of institutionalizing the assumptions that supported the small force mindset. The lack of available US military manpower in Phase IV also contributed to further assumptions regarding the Iraqi operational environment. A 2007 GAO Report to Congressional Committees²⁴ identified three assumptions that contributed to security challenges in postwar Iraq:

1. The Iraqi regular army would ‘capitulate and provide security.’
2. Iraqi resistance was unlikely.

3. Postwar Iraq would not be a US military responsibility.

The small force argument encouraged an optimistic assessment of the Iraqi operational environment. The planning assumptions identified in the GAO report were not treated as assumptions, but as facts. Doctrine demands that assumptions must be continually reviewed to ensure validity, challenged if they appear unrealistic and that branch plans must be developed should they prove untrue.²⁵ The OIF plans did not identify risk mitigation strategies (branch plans) in the event that these assumptions proved false.²⁶ A plausible reason for choosing not to branch plan is that there were insufficient US forces available to accomplish additional tasks and missions. The behavioral basis for predisposition to specific COAs is described by Rittel and Webber:

‘People choose those explanations which are most plausible to them. Somewhat but not much exaggerated, you might say that everybody picks that explanation of a discrepancy which fits his intentions best and which conforms to the action-prospects that are available to him.’²⁷

In effect, OIF planners had been ‘painted into a corner’ by the political context and the imperative to deploy a relatively small force. The failure in planning therefore was not simply an inability to frame the problem. Failure derived from an inability to articulate the risk to the plan in the event that the assumptions proved invalid. That is why there was no plan for the insurgency. Furthermore, the failure to articulate those risks caused ‘cascading effects on decisions’²⁸ that had far more destructive consequences than the overall troop levels. Enterline et al have argued that ‘*troop levels are not the most decisive factor*’ and that even the largest

force recommended in General Zinni's 100398 OPLAN would have had little impact on levels of Phase IV political violence.

Largely as a result of our inability to predict and react to the insurgency in Iraq, the current operational design debate is focused on framing methodologies. This paper will examine current and emerging doctrine and agree that it is important to frame the problem correctly and to be ready to reframe. However, it will go on to suggest that operational design makes a greater contribution to successful execution when it focuses on decision support. Design brings discipline and focus to decision analysis. The 'pre-planned' and emergent decisions the commander knows he is going to make need to be built into the campaign's operational design. If operational design provides the framework for an operation, then the decision points it identifies represent the joints. Surrounding those decisions are a host of risks, intended and unintended effects and Commander's Critical Information Requirements (CCIR). In OIF not only were assumptions not clearly stated and branch planned, but a series of major 'pre-planned' decision points were 'ad hoc'd' and uncoordinated. The de-Baathification program, dissolution of the Iraqi Army, security of munitions storage sites and the growth of the insurgency suffered from a lack of decision analysis and an inability to express military risk to the political leadership. Comprehensive operational design that supports the commander's visualization of the campaign through a cognitive map should serve to articulate up front risks to the plan. Armed with the insights decision analysis should provide, the commander should be able to communicate those risks to the leadership, interagency partners and components. That did not happen with sufficient clarity in OIF.

This paper will show how operational design can support the commander's decision analysis and provide a framework that explicitly identifies risks within the campaign plan. It is

first necessary to examine the origins and antecedents of current US doctrine and where the weaknesses lie. It will then identify emerging doctrinal developments that address the identified deficiencies in problem framing and mission analysis.

PART 2 – THE RESPONSE

Current Design Doctrine

The operational level of war is a complex environment. It is the crossroads of national strategic guidance, military synthesis and analysis and the translation of strategic intention to tactical action. There is the potential for serious ‘cognitive tension’²⁹ as the commander attempts to grapple with the complexities of competing priorities and alternative or opposing options. The challenges and contradictions of the operational level of war are reflected in current doctrine. The roles and relationships of operational art, design and planning are profoundly unclear. Current design doctrine offers little more than a ‘shopping list’ of design elements that are shared and intermixed with operational art’s lexicon.

The relationship between operational art and design is important to delineate. By definition, operational design is subordinate to and a subset of operational art. JP 5-0 offers little by way of explanation. It stresses the fact that design is intrinsic and fundamental to the Joint Operational Planning Process (JOPP).³⁰ Furthermore, the design process and its elements are used throughout the JOPP - principally when the commander interacts with planners. JP 5-0 does not clearly state that operational design’s purpose is to enable synthesis³¹ in order to create systemic or shared understanding and then to support subsequent analysis. The intermingling of art and design presents an unhelpful and confusing impression of the commander’s role in both the design and planning processes.

The origins of the confusion at the heart of planning doctrine lie in the way the concepts have evolved over time. The US Army adopted the idea of the operational level of war in its 1982 Field Manual 100-5.³² Operational art as an ‘identifiable activity’³³ was incorporated four years later. Furthermore, three “Key Concepts of Operational Design” also appeared in doctrine

in 1986 – center of gravity, lines of operation and culmination. These terms were all brought into Joint doctrine under the Goldwater-Nichols Department of Defense Reorganization Act in the same year. The supporting concepts of art and design became ‘blended’³⁴ in 1995 when JP 3-0 introduced the fourteen facets of operational art. Over time these facets have been transferred to the list of seventeen design elements that are listed in JP 5-0. The simple addition of more and more of these design elements will do very little to improve our collective understanding of the commander’s roles in design and planning activities and serve to further confuse the concept and role of operational art.

This unhappy state of affairs has prompted some observers to call for an overhaul of current doctrine. Unlike the proverbial rolling stone, current doctrine has gathered a lot of ‘moss’ on its 28 year odyssey. Dr Richard Swain recently opined: ‘Current doctrinal notions of strategy, operational art, and tactics need to be rescued from their Cold War connotations and post-Cold War hardening.’ The necessity of more clearly delineating the two related but distinct concepts of operational art and design is not purely academic whimsy. As two separate entities, art and design provide the commander and his staff with ‘an impartial organizational structure for conducting problem framing.’³⁵ Joint doctrine should stress in precise terms the necessary separation of impartial operational design (as synthesis and problem framing) from the subsequent mission analysis process. Although the design process must be led by the commander (from the ‘balcony’ perspective³⁶, not the ‘dance floor’) any early injection of ‘informed vision’ or operational art is likely to result in bias and the consequent development of predisposition towards specific courses of action.

Recent developments in design enquiry have exposed the inadequacies of its treatment in publications such as JP 5-0. CDRUSJFCOM recently assessed that ‘our current doctrinal

approach to fostering clear, careful thinking and creativity, particularly early in design and planning, is insufficient and ineffective.³⁷ The lag in the development of better advice to the Joint community reflects not just institutional confusion with the separation of competing concepts of art and design, but also the foundational importance of settling how design will move forward. The origins of the upsurge in design methodology enquiries may well lie in our collective unhappiness with perceived planning failures in Iraq described in Part 1. A shared and comprehensive understanding of design requirements has not been sufficiently developed. This has induced paralysis at the top of the doctrine tree. Military professionals such as BG (Ret) Huba Wass de Czege who have confronted the core challenges of operational art and ill-structured problems have noted that ‘there certainly is very little useful guidance in service or joint doctrine at present.’³⁸

The ineffective nature of the guidance given by joint doctrine has led to the ‘infiltration’³⁹ of design terminology and ideas into various parts of JP 3-0 Joint Operations, FM 3-0 (Chapter 6), FM 6-0, FM 3-24 (Chapter 4) and most recently the US Army’s Commander’s Appreciation and Campaign Design (CACD).⁴⁰ The proliferation of design ideas in doctrine reflects a need to ‘gain understanding of a complex problem and (provide) insights towards achieving a workable solution.’⁴¹ As already discussed, the confusing relationship between operational art, design and planning masks how they should properly interact:⁴²

1. Operational art is informed by national or multinational strategic direction.
2. Operational design supports operational art by framing the problem and by providing a ‘starting hypothesis’ that gives the problem structure: synthesis and analysis.

3. The shared understanding that results forms the basis of the commander's *informed vision* that contributes to strategy development through the JOPP.

Operational design therefore resides within the JOPP but is necessarily initially separated from those elements of operational art that the commander and staff use to develop strategy. Those design elements that add structure should be identified in doctrine as 'design elements': end state, objectives, effects, centers of gravity, decisive points, lines of operation, arrangement of operations and (potentially) assumptions. All of these elements answer the 'what' question, not the 'how' which is properly preserve of strategy and planning domains. Although the commander is absolutely central to design and strategy development, the 'bifurcation' of the two is essential in order to prevent the infiltration of preconceived courses of action into the plan.

The understanding of the relationship between operational art and design is fundamental to ensuring successful interaction with the rest of the JOPP.

Emerging Design Doctrine

"If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it." Albert Einstein⁴³

Problem framing is one of the core functions of operational design. 'Tame' or well structured problems require only a simple form of Aristotelian mission analysis. They can be broken down into parts and treated accordingly. Davison⁴⁴ argues that this linear approach has lost its utility with the demise of the Soviet Union. We developed a rational view of the enemy from which his intentions and motivation could be understood in entirely rational terms. Under

these circumstances the adversary is treated as a ‘mechanistic or mindless system.’⁴⁵ Davison further argues that much of current approach to mission analysis relies upon this systemic, rational model. If we rely on accurately predicting ‘dynamic, nonlinear threat behavior’ we are likely to develop counters to the wrong threat. The Joint Intelligence Preparation of the Battlespace (JIPOE) has been seen as an essentially linear approach to solving tame problems. Although JP 5-0 acknowledges that JIPOE must be ‘front-loaded’ into the JOPP and that it cannot accurately predict ‘inherently complex and dynamic’⁴⁶ system behavior, it offers little more practical scope for countering unfamiliar or adaptive threats. Where threats are ill-defined or unknown, the systems analysis offered by JIPOE is likely to lead to weak and incomplete mission analysis.

It is beyond the scope of this paper to offer a full examination of systems vs. socio-cultural based approaches to planning. However, much of the design debate has focused on the potential contributions of Effects Based and System of Systems Approaches (EBA, SoSA). EBA view the threat as an interrelated system of Political, Military, Economic, Social, Information and Infrastructure (PMESII) systems. Critics of SoSA argue that the EBA ‘persists in planning circles’⁴⁷ and is a pseudo-scientific liability that seeks to impose chains of cause and effect that do not exist in human behavior.⁴⁸ It is argued that the complex, human terrain of the COE defies systemic modeling. The PMESII systems language is retained in JP 3-0 and JP 5-0 to describe characteristics of the operating environment but CDRUSJFCOM announced much of EBA, Operation Net Assessment (ONA) and SoSA defunct in August 2008.⁴⁹

For a number of years Systemic Operational Design (SOD) and a collection of subtly alternative but essentially derivative theories have promised to break through into mainstream doctrine. SOD itself has matured and developed over the period. Reflecting the current state of

systems thinking, it addresses the uncertainties present in the operating environment by offering the ability to continuously reframe the problem. SOD employs *discourse* in order to reach a shared understanding of the problem. Discourse across the design group is meant to test arguments about the nature of the actors, interest groups and relationships to create a system frame. Based on the shared understanding of the systems frame, the group then creates a mental model of the desired state of affairs or system. This desired system is based on both the initiating guidance and ‘the professional judgment of what would be desirable and attainable *based on what has been learned* about the existing state of affairs.’⁵⁰

“The systems approach ‘of the first generation’ is inadequate for dealing with wicked problems. Approaches of the ‘second generation’ should be based on a model of planning as an argumentative process in the course of which an image of the problem and its solution emerges gradually among the participants, as a product of incessant judgment, subjected to critical argument.”⁵¹

The SOD approach, it is argued, gradually teases a fuller understanding of the problem, initiating guidance and desired system states. A simplified synopsis cannot fully express the full potential of the SOD approach, but it highlights its main characteristics.

Having identified the difference between the system frame (current state) and the desired frame (future state), the design team next refines its understanding of the system from the competing logic of friendly and enemy perspectives. They also assess where the ‘mobilizable energy’⁵² is available to all parties that might help or hinder progress towards the achievement of the desired system. These logics are known as the rationales of command, adversary and

logistics. This refinement of the system frame is followed by the formulation of the problem or how to go about transforming or transitioning towards the desired system frame. This is the theory of action that informs the rest of the planning process. This transitional step is commander led, as it draws upon his experience, skill and the knowledge gained from the framing enquiries to articulate strategy⁵³ and risk. SOD acknowledges uncertainty, change and adaptation⁵⁴ and allows for new information and understanding to be incorporated. It encourages adaptation to threat rather than prediction of threat behavior. Furthermore, it actively seeks emergencies by monitoring evidence of the system's response to inputs.⁵⁵

SOD appears to address many of the doctrinal weaknesses identified earlier whilst offering a means to adapt and learn in complex missions. Why then has it not been incorporated across the defense community? Usually, five main reasons are offered:

1. The dystopian view of the future operational environment characterizes it as complex. As a human interaction, is it significantly more complex today than in the past?⁵⁶
2. Properly executed, our current mission analysis JOPP step should not be 'mindless' and should already incorporate significant, structured discourse.⁵⁷
3. We are more comfortable initiating planning with a defined statement of what needs to be accomplished rather than a more vague 'desired state.'
4. The methodology and language of SOD are 'difficult.' Professional Military Education does not currently prepare officers to take to SOD intuitively.
5. Our unhappy experience with Effects Based methodologies tends to discourage departure from tried and tested approaches.

SOD has not yet achieved doctrinal breakthrough. However, the approach has attracted numerous supporters who recognize its potential. Several fusion models have emerged that attempt to blend and translate SOD into extant concepts and doctrine. Publications such as the first version of the Commander's Appreciation and Campaign Design (2008) incorporate systems theory and complexity in order to help the commander understand the operating environment. Bearing many of the hallmarks of SOD, it exhorts commanders to participate in 'heavily *inductive* reasoning process(es)'⁵⁸ to frame problems and produce campaign designs. In its subsequent discussion of the 'deductive' planning process, it is clear that the intellectual horsepower is deployed 'upfront'⁵⁹ in the framing discourse.

Emerging doctrine's ability to remedy many of the perceived problems that contributed to failures in Iraq is attractive. The 'compulsion towards introspection'⁶⁰ that Vohr identifies should not lead to a rejection of current planning processes. Before we introduce wholesale new design concepts we should first consider clarification and improvement of existing concepts. At this stage in its institutional development, operational design needs to expand across command and staff competencies. The relationships between the elements must be understood, linked and clearly explained. This endeavor will not be served by the generation of specialist design language and cadres. Clearly, unstructured, complex, multidisciplinary problems will require specialist treatment. We should encourage the contribution of conceptual and experimental treatment of these problems by our 'brightest and best' thinkers. However, most commanders and general staffs will be better served by the practical extension of proven, effective and well grounded concepts that 'make sense of complex situations, making rational the seemingly irrational.'⁶¹

PART 3 – DECISION SUPPORT

Decision Support in Operational Design

SOD and emergent fusion models stress the importance of framing and reframing the problem. Framing is important. It sets the starting hypothesis for the problem's resolution. Reframing is important. It enables the commander to learn during execution and adapt to the operating environment's complexity, fog and friction. But framing/reframing is only half of the equation. The other half is how to execute the planned course of action and enable the commander to make timely and appropriate decisions. This is where operational design can play a significant contribution in the execution of the campaign. CACD asserts that the cognitive processes to enable learning and decision support are addressed by current joint and Army doctrine.⁶² Assessment, the process that measures progress of the joint force toward mission accomplishment,⁶³ provides opportunities to learn on five levels. CACD states these are:

1. How to execute the planned course of action for a specific operation;
2. Whether another course of action needs to be adopted;
3. Whether the operational design based on the problem frame is producing results;
4. Whether the problem framing needs adjusting; and
5. Whether the learning mechanisms of the organization are tuned to the particular operational problem.

The purpose of approaches like that described in CACD is to enable reframing in order to address the current deficiencies in 3-5 above. However, this neglects the important contribution operational design should play in the development of decision criteria.

Assessment is conducted at all echelons.⁶⁴ The assessment process is continuous and directly tied to the commander's decisions throughout planning, preparation, and execution of operations.⁶⁵ During the mission analysis phase of the JOPP assessment considerations are used 'to help guide operational design because these considerations can affect the sequence and type of actions along LOOs.'⁶⁶ The danger of the approach described in JP 3.0 *Operations* is that it 'puts the horse before the cart' and encourages the planning staff towards predetermined courses of action. Decision analysis should not take place before a solution or course of action has been developed.

Reilly identifies three critical junctures in the JOPP where the operational design can significantly influence decision analysis.⁶⁷ The first is in the delivery of the JFC's strategic guidance. Secondly, in the development of the Decision Support Template (DST) during COA analysis and wargaming. Finally, design contributes to the production of a Decision Support Matrix (DSM) to aid the commander during execution. Operational design is often characterized as either an activity that occurs within the mission analysis step of the JOPP or one that simply provides a link or 'bridge' between mission analysis and COA development. This is an increasingly irrelevant view of the contribution design makes to the campaign.

Operational design not only brings structure and purpose to a campaign plan, it provides a 'foundational basis'⁶⁸ for the formulation of planned and emergent decision points. The link between problem framing (providing insight and context) and the development of decision support criteria (articulating risk and opportunity) should be obvious and intrinsic. Operational design does provide structure, but this structure does not simply support a proposed COA. What is learnt from the development and analysis of proposed COA during the JOPP should inform the commander where the risks and opportunities lie within the plan. These risks and opportunities

will often coalesce around decision points. Once identified, decision points should be integrated (along with their attendant CCIR) into the overall operational design. When displayed along functional lines of operation on a cognitive map, the identified decision points provide robust structural integrity to the campaign design. The integration of decision support material into the operational design by means of the cognitive map offers a powerful fillip to the commander's visualization. FM 6-0 describes how decision points 'can be identified in the plan or as a result of unanticipated enemy actions.'⁶⁹ Furthermore, 'their commands are flexible enough to execute mission changes on short notice.' Clearly, a staff that can identify and successfully treat the decision points in the plan will have greater capacity to deal with emergent threats and opportunities (or variances in FM 6-0) during execution.

This paper proposes there are three main types of decision point: preplanned emergent and imposed. Preplanned decision points are developed in the manner described above. They may include phase transition decision criteria, the deployment of a major force element or the initiation of an information operations (IO) phase. Emergent decision points are those generated by unplanned risks or opportunities. These might emerge 'out of the blue,' through operational assessment or as a result of problem reframing. Examples might include the emergence of new insurgent operational approaches, the detection of new enemy capabilities or the overwhelming success of psyops. Finally, imposed decision points are those that are external to the operating environment that the JFC has no ability to influence, but will nevertheless impact the campaign. These could include changes in political guidance, the withdrawal of an important coalition ally or the emergence of a potentially 'game changing' IO situation (such as the Abu Gharib debacle). Each of these classes of decision point offer the commander risk and opportunity but each will have been treated in different ways. All require some degree of decision analysis

before being acted upon. Clearly, the difference in each case is the time available for decision analysis and a resulting uncertainty regarding the effects of decisions.

In ‘Theory and Methods for Supporting High Level Decision-making,’ Davis and Kahan characterize high level military decision support as being consistent with an ‘uncertainty-sensitive approach.’⁷⁰ That decision framework is characteristically:

‘top-down, expressing concepts in simple and intuitive language, dealing explicitly with risk and uncertainty, and providing zoom capability so that decision makers can readily discover and question the bases for key assumptions and assessments.’⁷¹

These are therefore the shorthand characteristics for a military decision support system. Those preplanned decision points identified during the JOPP and integrated into the operational design should be under constant scrutiny in order to verify their validity. As there is sufficient time in advance of decision implementation, the relevance of the DSM should be tested by reframing around the decision point. Conditions within the operating environment may have altered the risks, assumptions and effects associated with the decision. Having verified the decision criteria, the commander can express the risks to his leadership and so provide the necessary ‘zoom capability.’ Of course all decisions taken in the complex COE will necessarily entail some unintended consequences. Preplanned decisions require ‘foresight.’ As we are unable to predict unintended effects, providing foresight ‘recognize(s) enough of the possibilities to be materially and mentally prepared to adapt when surprising developments occur.’⁷² As much of the same type of analysis should be conducted around emergent and imposed major

decision points as time permits. The adaptation of an existing DSM with relevant CCIRs should help the commander to make timely and informed decisions.

Decision points provide the campaign plan's structural integrity. Operational design should help commanders to execute their mission by providing direction. As major decision points approach or emerge the associated risks, assumptions and timing should be verified. The risks in the proposed decision can then be expressed to executive leadership coherently.

Potential Development

Operational design is here to stay. Our priorities should be to solidify the conceptual basis for design, tidy up single service and joint doctrine and educate service personnel through structured joint professional military education. The entire staff needs to be able to grasp the fundamentals of operational design and how the elements interact. Furthermore, design methodologies and their influence on campaign planning and execution should expand beyond their current limitations. At issue are 'ownership' of operational design and the potential for growth in design techniques in the interagency context.

All doctrinal treatments of design agree that, as an operational artist's tool, it should be led by the commander. Whether through a narrative format or cognitive map, the operational design of the campaign should be central to the commander's operational approach or visualization.⁷³

As General Mattis noted in October 2009:

'The commander should assume ownership of the operational approach, a product the commander and staff can use to explain the operational problem and approach to superiors, subordinates, other US agencies, and multinational partners.'⁷⁴

Unlike some of the other products of mission analysis that are used as a bridge to further planning, the commander's operational design is a living document. As assessment indicators are identified that trigger decision making or reframing, the design outputs should be revised. All of the staff needs to understand the commander's operational approach as the J2, J3 and J5 branches have significant interaction with the design during planning and execution. However, although the commander 'owns' the operational design, it should be managed on his behalf by the J35.

There have been numerous calls for the development of common planning processes across all agencies that have a stake in the operational environment. In December 2009, the Army Capstone Concept expressed this comprehensively:

'Because U.S. interagency, intergovernmental, and international partners reside outside traditional military command and control structures, unity of effort requires the development of common or interoperable design and planning processes in order to establish a shared understanding of the situation, the problems, goals and objectives, and roles and responsibilities.'⁷⁵

The complexities inherent in the COE predict increasing co-operation across the interagency and with international partners. Clearly, operational design offers an opportunity to integrate common planning processes. There is strong informal evidence from interagency and international exercise scenarios that suggests the use of cognitive map and common DSM formats offer intuitive sharing of the commander's vision and operational approach.

There are of course significant hurdles to overcome in the practical extension of operational design to an interagency and international audience. Many of these hurdles apply almost as equally in the purely military context. First and foremost, operational design expertise is seen as specialist knowledge. It has developed a language of its own with which commanders and staff may be unfamiliar. Acronyms abound. Even within planning circles, some aspects of emerging design methodologies involve ‘difficult’ concepts that are not intuitive. These institutional hurdles will need to be overcome if design is to truly develop. For international and interagency participation in design we will need to address the traditional lack of ‘jointness’ across government departments, security issues and the establishment of agreed supported/ supporting relationships.

The ‘inherent complexities that cloak the operational level of war’⁷⁶ have held operational design back for too long. In order to play its crucial role in framing complex problems, formulating decision points, driving decision analysis and communicating the commander’s operational approach, military professionals at all levels must become operational design literate. This endeavor requires commitment to JPME, the clarification of service and joint doctrine and advocacy of design integration at the joint, multinational and interagency levels. In providing structure, shared understanding and comprehensive decision support, operational design should serve as a powerful and fundamental tool at the operational artist’s disposal.

Conclusion

Design will undoubtedly play an increasingly important, if not foundational, role at the operational level of war. The intensity of the debate over how to integrate design stems principally from the perception of failure to adapt to the insurgency in Iraq, and the notion that the future operational environment will be inherently complex. These factors have biased design development towards problem framing methodologies. Part 1 begins by introducing the challenges of the current operating environment (COE). Complexity and the identification of ‘wicked’ problems have established the need for development of more sophisticated problem framing methodologies.

Part 2 began by examining the legacy of OIF. Failures in OIF planning were primed by faulty assumptions and their contribution to a predisposition towards specific courses of action. It is argued that many of the more destructive consequences of OIF execution could have been identified and mitigated by the appropriate treatment of the risks surrounding those assumptions. Operational design offers a disciplined and decision centered methodology for dealing explicitly with risks to the plan.

Current operational design doctrine is weak and fragmented. The growing list of design elements offers little practical guidance on the relationship between operational art, design and planning. These weaknesses need to be addressed urgently as operational design’s fundamental importance expands into a growing number of disparate joint and service documents. Emerging doctrine offers encouraging methodologies for framing, reframing and adaptive learning. SOD and its derivative fusion models engage the issue of complexity, but offer little on the successful integration of decision analysis.

Part 3 discussed the most significant, if often overlooked, contribution of operational design – decision support. Design’s campaign framework is strengthened considerably by the analysis and exploitation of pre-planned, emergent and imposed decision points. Failure to identify and plan around major decision points will lead us into the type of incoherent and inept execution characterized by Phase III to IV transition in OIF. The specific CCIRs surrounding each of the ‘pre-planned’ decisions the commander is *going* to have to make should be under constant scrutiny for changes in their validity criteria. Each major decision point is a potential pole for reframing. Furthermore, the discipline and rigor of design’s decision support techniques, when coupled to sensitivity to changes in the operational environment should enable the commander and staff to adapt in step to variances and developing threats. Operational design supports commanders and staffs best when it employs simple and intuitive language and deals explicitly with risk and uncertainty. It is the practical extension of the commander’s operational art. It must therefore be a commander led activity that is managed and developed continuously by the staff. The entire staff must understand the fundamentals of operational design, and how its major elements interact. The J35 should manage the commander’s design.

Finally, the commander’s operational approach should be expressed by means of a cognitive map and decision support matrix. These products clearly express risks in the plan and in upcoming decisions. The intuitive appreciation offered by design products should enable the commander to share his vision to senior leadership, higher headquarters, subordinate components and the interagency. The adoption of common design and planning processes across joint, departmental and multinational communities will present opportunities for the integration of non-military instruments with unity of purpose.

Operational design will play an increasingly important role in campaign planning and execution at the operational level of war. We must get the fundamentals of design enquiry right and these should be reflected in joint doctrine and training. The design debate currently favors the development of competing framing methodologies. Framing the problem is important. However, as events in OIF demonstrate, framing is only half of the problem. Operational design must support decision analysis. The risks and opportunities in the plan will only be revealed by the structured analysis of planned and emerging decision points. When decision support is incorporated into the campaign framework, it becomes stronger and more responsive to the operational environment.

Notes

¹ US Department of Defense. *Capstone Concept for Joint Operations, Version 3.0.* (CCJO) Washington, DC: Department of Defense, January 2009, p2

² Defence Concepts and Doctrine Centre, *Global Trends out to 2040*, 4th Edition, UK Ministry of Defence, <http://www.mod.uk/defenceInternet/microsite/dcdc/> p3

³ *ibid*

⁴ Mattis, J. N.Gen, Commander, USJFCOM. Memorandum for USJFCOM, Subject: Vision for a Joint Approach to Operational Design, 6 October 2009

⁵ TRADOC Pamphlet 525-5-500, Commander's Appreciation and Campaign Design (CACD), Version 1, 28 Jan 2008, <http://www.tradoc.army.mil/pamndx.htm>, p7

⁶ *Ibid*, p7

⁷ "Our enemies are adaptive and will develop systems and tactics that exploit our vulnerabilities." US Department of Defense, *Quadrennial Defense Review Report*. Washington, DC: Department of Defense, February 2010, p20

⁸ CCJO, (2009), p4

⁹ Horst W J Rittel and Melvin M Webber, Dilemmas in a General Theory of Planning, *Policy Sciences 4* (1973), p155

¹⁰ *Ibid*, p156

¹¹ *Ibid*, p155

¹² TRADOC Pamphlet 525-5-500, (2008), p9

¹³ Operational level of war — The level of war at which campaigns and major operations are planned, conducted, and sustained to achieve strategic objectives within theaters or other operational areas. activities at this level link tactics and strategy by establishing operational objectives needed to achieve the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. Joint Publication (JP) 1.02. *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001, (as amended through 31 October 2009), p395

¹⁴ Operational design — The conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution. *Ibid*, p394

¹⁵ TRADOC Pamphlet 525-3-0, Army Capstone Concept. *Operational Adaptability: Operating Under Conditions of Uncertainty and Complexity in an Era of Persistent Conflict – 2016-2028*, 21 Dec 2009, p16

¹⁶ http://thinkexist.com/quotes/georg_wilhelm_friedrich_hegel/2.html

¹⁷ CDRUSJFCOM, 6 October, 2009

¹⁸ Operational art — The application of creative imagination by commanders and staffs — supported by their skill, knowledge, and experience — to design strategies, campaigns, and major operations and organize and employ military forces. Operational art integrates ends, ways, and means across the levels of war. JP 1-02, (2009), p393

¹⁹ Testimony before the Senate Armed Service Committee, February 25, 2003, downloaded from LexisNexis Congressional on March 4, 2007, from Andrew Enterline, J. Michael Greig and Yoav Gortzak, *Testing Shinseki: Speed, Mass & Insurgency in Postwar Iraq*, University of North Texas, 10 December 2008

²⁰ Genral Tony Zinni, USMC (Ret) and Tony Koltz, *The Battle for Peace. A Frontline Vision of America's Power and Purpose*, Palgrave Macmillan, New York, 2006, p27

²¹ Enterline et al, p1

²² *Ibid*, p4

²³ J Alex Vohr, Commander's Appreciation and Campaign Design, *Marine Corps Gazette*, Quantico, March 2009, Issue 3, p15

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- ²⁴ GAO Report to Congressional Committees, Operation Iraqi Freedom: DOD Should Apply Lessons Learned Concerning the Need for Security over Conventional Munitions Storage Sites to Future Operations Planning, GAO-07, March 2007, p8
- ²⁵ Joint Publication (JP) 5-0. *Joint Operation Planning*, 26 December 2006, pIII-26
- ²⁶ GAO Report, (2007), p8
- ²⁷ Rittel and Webber, (1973), 12
- ²⁸ Jeffrey Reilly, *Operational Design: Shaping Decision Analysis through Cognitive Vision*, 2nd Ed, 2009, Air University Press, p42
- ²⁹ TRADOC Pamphlet 525-5-500, (2008), p15
- ³⁰ JP 5-0, pIV-2
- ³¹ Synthesis: The combining of the constituent elements of separate material or abstract entities into a single or unified entity. CACD, (2008), p15
- ³² Richard Swain, Commander's Business: Learning to Practice Operational Design, *Joint Forces Quarterly* 53, 2nd quarter 2009, p 68
- ³³ Ibid, p68
- ³⁴ Jeffrey Reilly, 2009, p6
- ³⁵ Reilly, (2009), p7
- ³⁶ Swain, (2009), p67
- ³⁷ CDRUSJFCOM, Memo, 6 October 2009
- ³⁸ BG Huba Wass de Czege USA (Ret), *Renewing the Core of Operational Art: How to Design Sound Campaign Strategies, Learn Effectively and Adapt Rapidly and Appropriately*, USSOCOM CJO J5 Strategy Division, Operational Design Workshop Reference Book, Feb 2009, Booz Allan Hamilton, p2
- ³⁹ Ibid, p2
- ⁴⁰ TRADOC Pamphlet 525-5-500, (2008)
- ⁴¹ Field Manual (FM) 3-24/Marine Corps Warfighting Publication (MCWP) No 3-33.5, *Counterinsurgency*, (15 December 2006), p4-4
- ⁴² Reilly, (2009), p10
- ⁴³ Albert Einstein cited in TRA DOC Pamphlet 525-5-500, (2008), p20
- ⁴⁴ MAJ Ketti C Davison, *Systemic Operational Design (SOD): Gaining and Maintaining the Cognitive Initiative*, School of Advanced Military Studies Monograph, Leavenworth, 2006, p10
- ⁴⁵ Ibid
- ⁴⁶ JP 5-0, pIII-18
- ⁴⁷ LT COL Tim Challens, USA (Retd), *Tipping Sacred Cows*, *Military Review*, Sep-Oct 09, p19
- ⁴⁸ Ibid, p21
- ⁴⁹ CDRUSJFCOM Commander's Guidance for Effects-based Operation, Gen J N Mattis USMC, 14 Aug 2008
- ⁵⁰ Swain (2009), p65
- ⁵¹ Rittel and Webber, (1973), p161
- ⁵² Richard Swain (2009), p65
- ⁵³ Strategy — A prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives. JP 1-02, p521
- ⁵⁴ Davison,(2006), p12
- ⁵⁵ Swain, (2009) p66
- ⁵⁶ Vohr (2009), p13
- ⁵⁷ Ibid, p13
- ⁵⁸ TRADOC Pamphlet 525-5-500, (2008), p(i)
- ⁵⁹ Ibid, p(i)
- ⁶⁰ Vohr, (2009), p16

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- ⁶¹ Huba Wass de Czege, BG USA (Ret), SOD: Learning and Adapting in Complex Missions, *Military Review*, Jan-Feb 2009 p7
- ⁶² TRADOC Pamphlet 525-5-500, (2008), p18
- ⁶³ Joint Publication (JP) 3-0. *Joint Operations*, 17 September 2006, Change 1 (13 February 2008), pIV-34
- ⁶⁴ Field Manual (FM) 5.01, *The Operations Process*, March 2006, p5-4
- ⁶⁵ JP 3.0, pIV-31
- ⁶⁶ Ibid
- ⁶⁷ Reilly,(2009), p44
- ⁶⁸ Ibid, p1
- ⁶⁹ FM 6-0, 4-50
- ⁷⁰ Paul K Davis and James P Kahan, Theory and Methods for Supporting High Level Decisionmaking, RAND , p Xiii
- ⁷¹ Ibid
- ⁷² Ibid pxiv
- ⁷³ FM 5.01, p3-14
- ⁷⁴ CDRUSJFCOM, Memo, 6 October 2009
- ⁷⁵ TRADOC Pamphlet 525-3-0, (2009), p37
- ⁷⁶ Reilly,(2009), p1

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